

Update on GenX concentrations in Wilmington drinking water and the effectiveness of home filtration systems

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PFASs are released into the environment by:

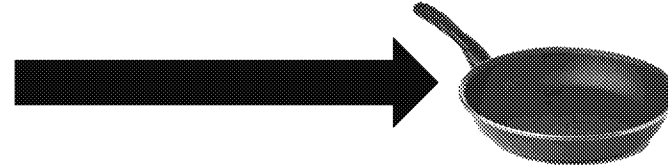


the manufacturing process, and sometimes



the use of products containing PFASs

- Non-stick coatings



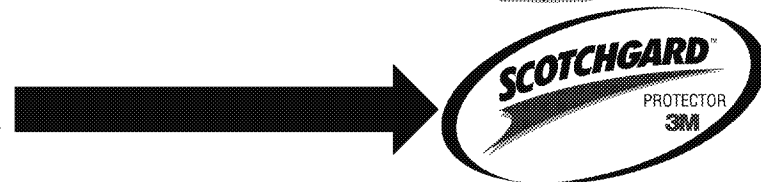
- Grease- and oil-resistant coatings for paper products



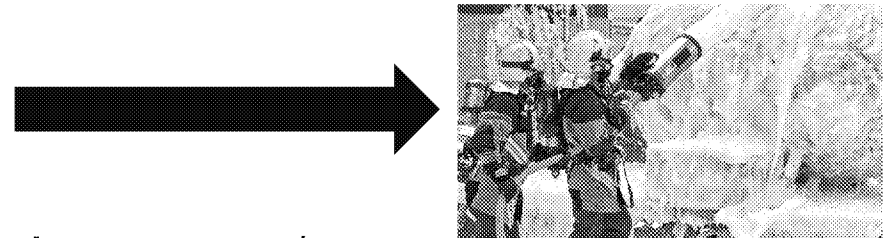
- Water repellent fabrics



- Stain-resistant coatings for fabrics, carpets, and leather

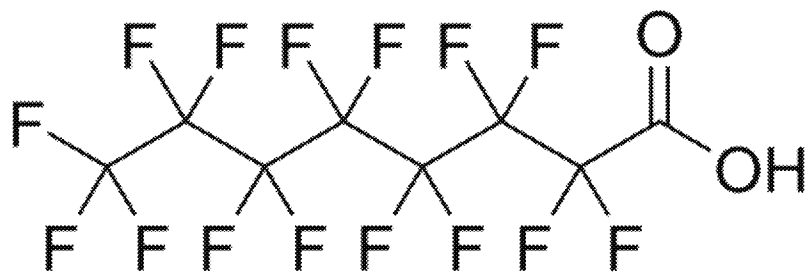


- Firefighting foams



Two types of PFAS have been heavily studied → “Legacy Compounds”

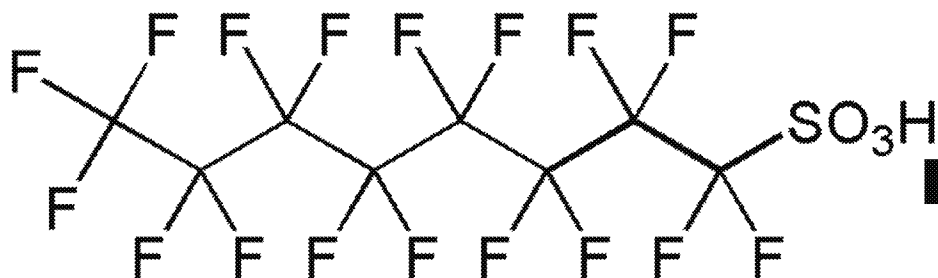
Perfluorooctanoic acid (PFOA / C8)



Common uses:
Goretex, Teflon



Perfluorooctane sulfonate (PFOS)

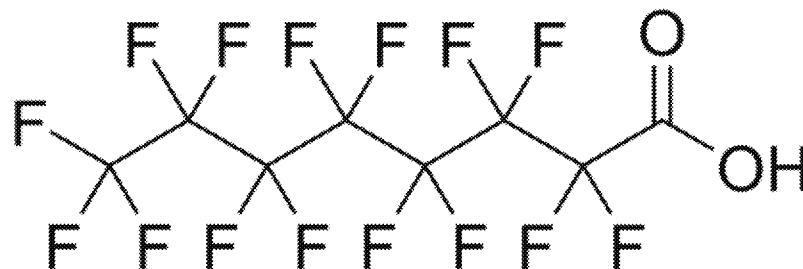
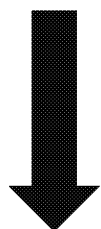


Common uses:
Firefighting, stain repellent

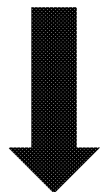


What is GenX?

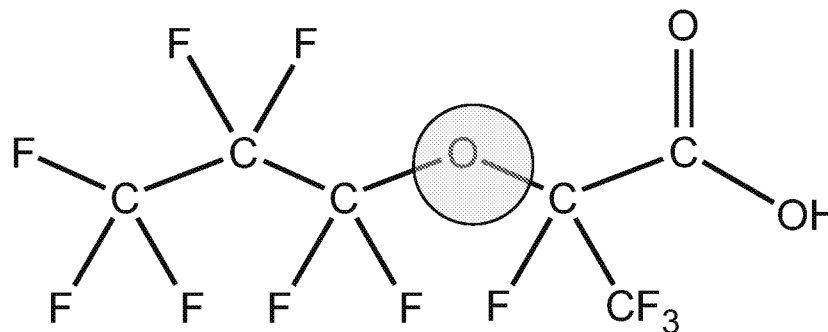
PFOA (C8)...



**Was
replaced
by GenX...**



**To manufacture
Teflon products**



**The two
compounds
are very
similar to
each other**



Once we are exposed to PFASs, they stay in the body for a long time

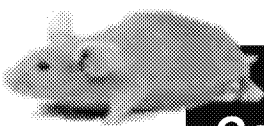
- We have **some** data for humans

Compound	PFOA (C8)	PFOS	PFHxA (C6)
Half-Life (Human)	3.8 years	5.4 years	32 days

C6 is the most similar to GenX, and gives us our best guess at its half-life

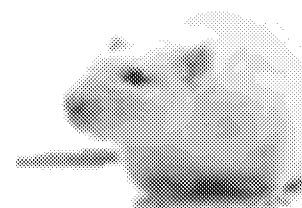
Half-life = the time it takes for the concentration of a substance to decrease by half

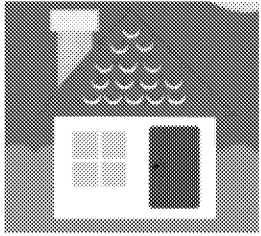
- We often rely on animal models to inform these...



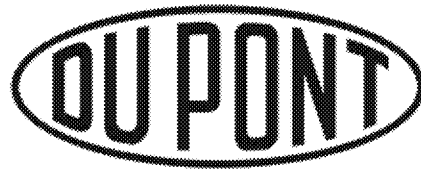
Compound	Half-life (Human)	Half-life (Female Rat)	Half-life (Male Rat)
PFOA (C8)	3.8 <u>years</u>	4 <u>hours</u>	6 <u>days</u>
GenX	??????	2.9 <u>days</u>	

But animal models don't seem to be great predictors here.





**Affected
Communities**
(Wood County, WV)

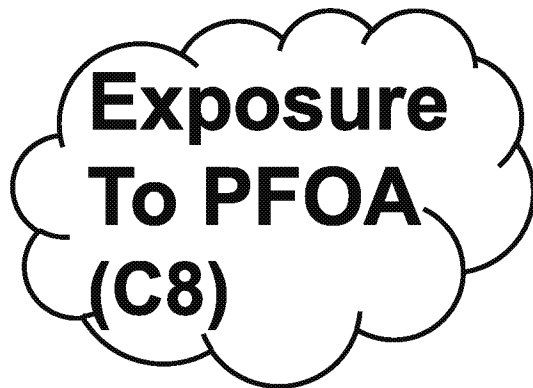
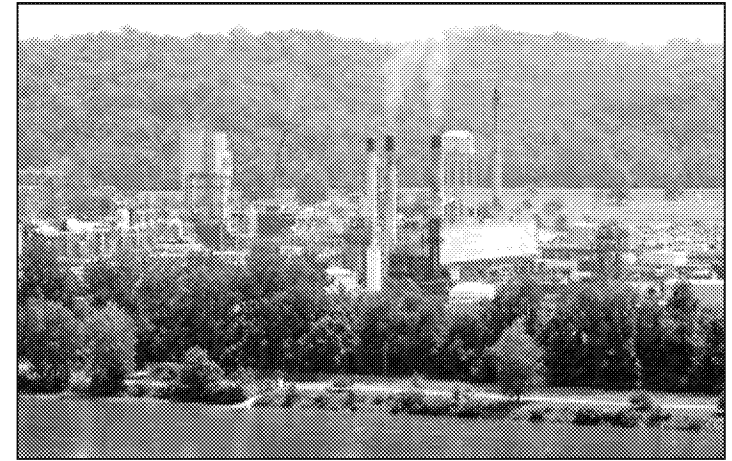


VERSUS



C8 Science Panel

(3 epidemiologists'
assessment of C8's risks)



**Probable
links to:**

- **Kidney cancer**
- **Testicular cancer**
- **High cholesterol**
- **Ulcerative colitis**
- **Pregnancy-induced hypertension**
- **Thyroid disease**

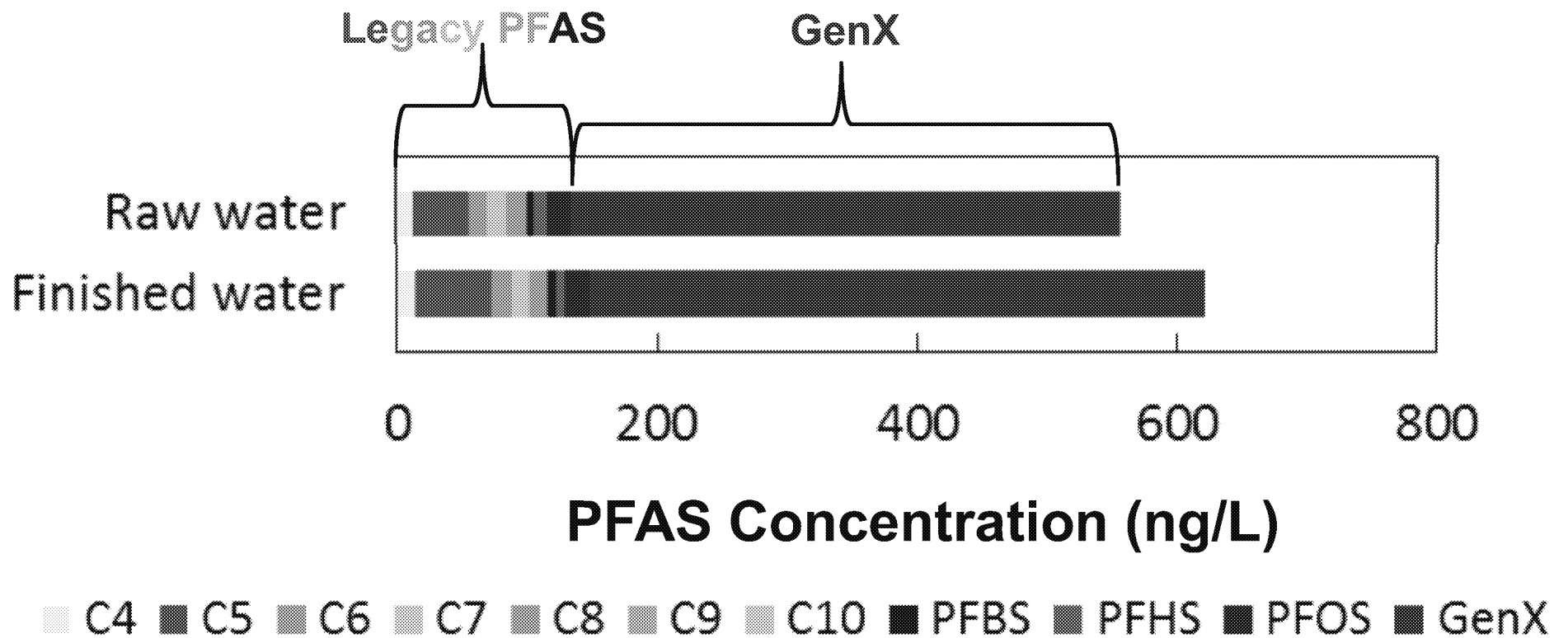
To protect the public from adverse health effects, the EPA creates health-based guidelines

EPA Health Advisory
(May 25, 2016) → PFOS + PFOA (C8):
70 ng/L (parts per trillion)

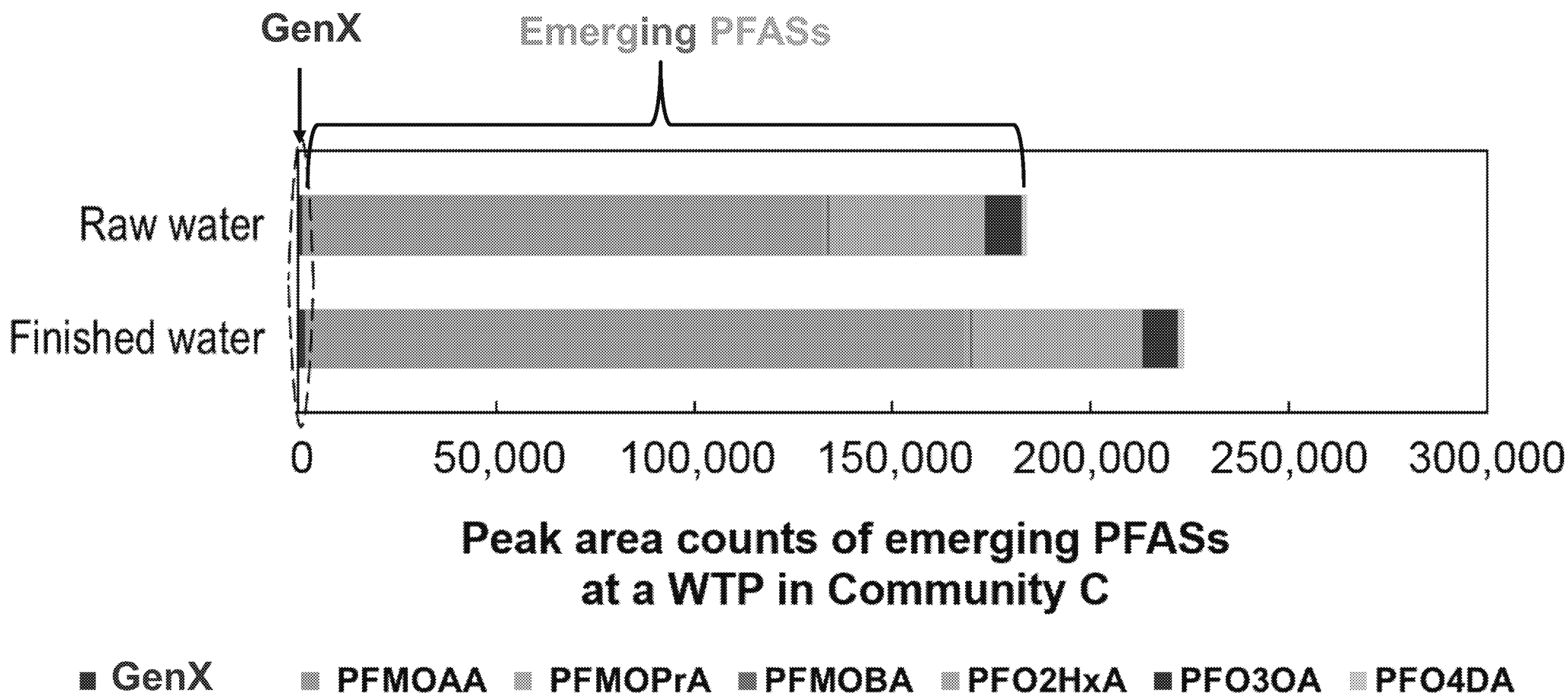
NC DHHS
Health Goal
(July 14, 2017) → GenX:
140 ng/L (parts per trillion)

There is no drinking water standard or health advisory level for the other ethers we found

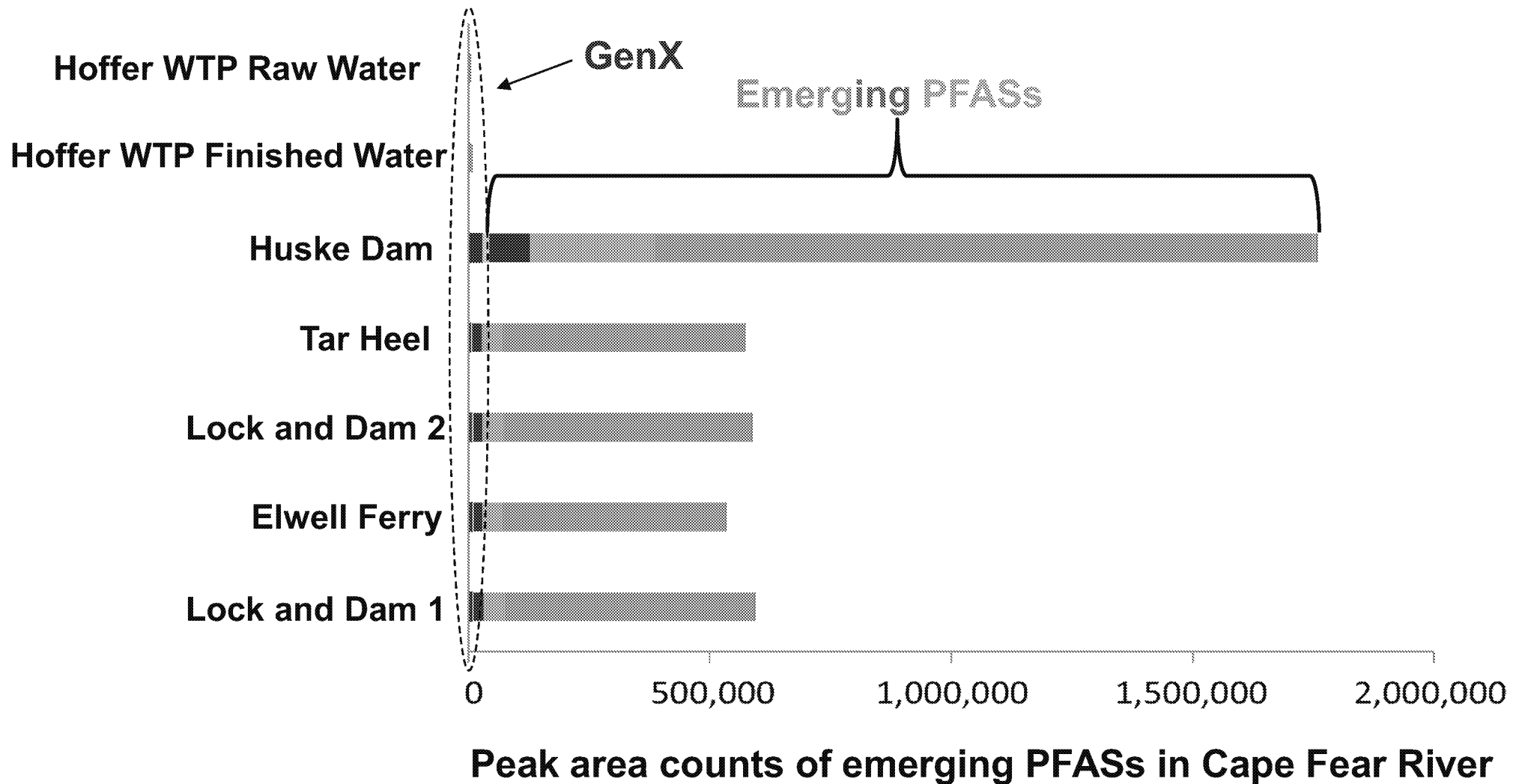
Conventional and advanced water treatments do not effectively remove legacy PFAS and GenX from drinking water



But, other similar substances occur at much higher concentrations than legacy PFASs and GenX

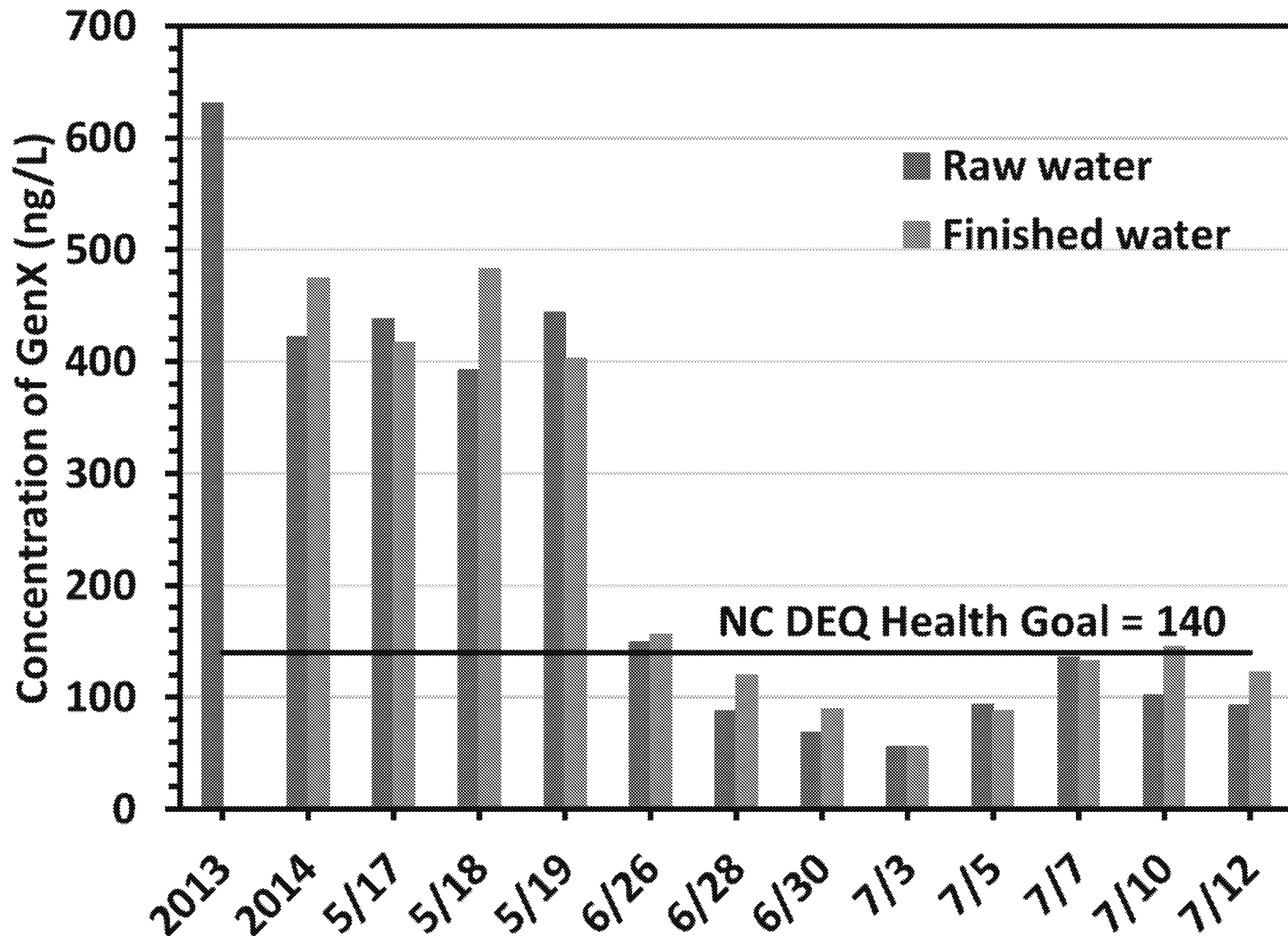


Concentrations of PFECAs stay almost constant after being introduced into the Cape Fear River (May 2017 data)

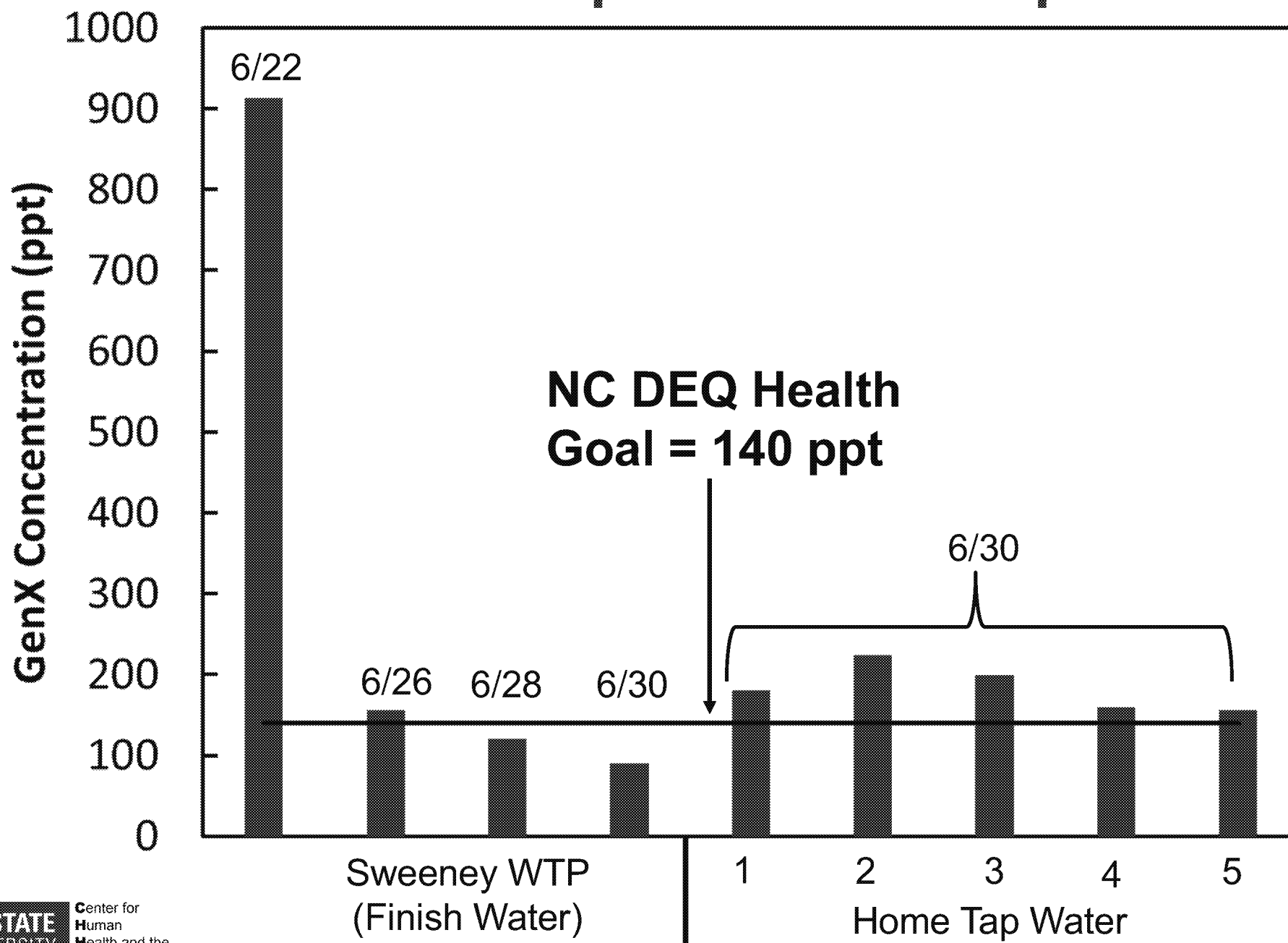


GenX PFO4DA PFO3OA PFO2HxA PFMOAA PFMOPrA PFMOBA

Change in GenX concentration at the Sweeney water treatment plant over time



How do GenX concentrations vary from water treatment plant to home tap?



Household Systems Tested

- **Reverse osmosis (under-the-sink)**
 - 5 systems
- **Granular activated carbon (whole house)**
 - 1 system
- **Granular activated carbon & ion exchange (IX) resin (whole house)**
 - 1 system

Reverse Osmosis



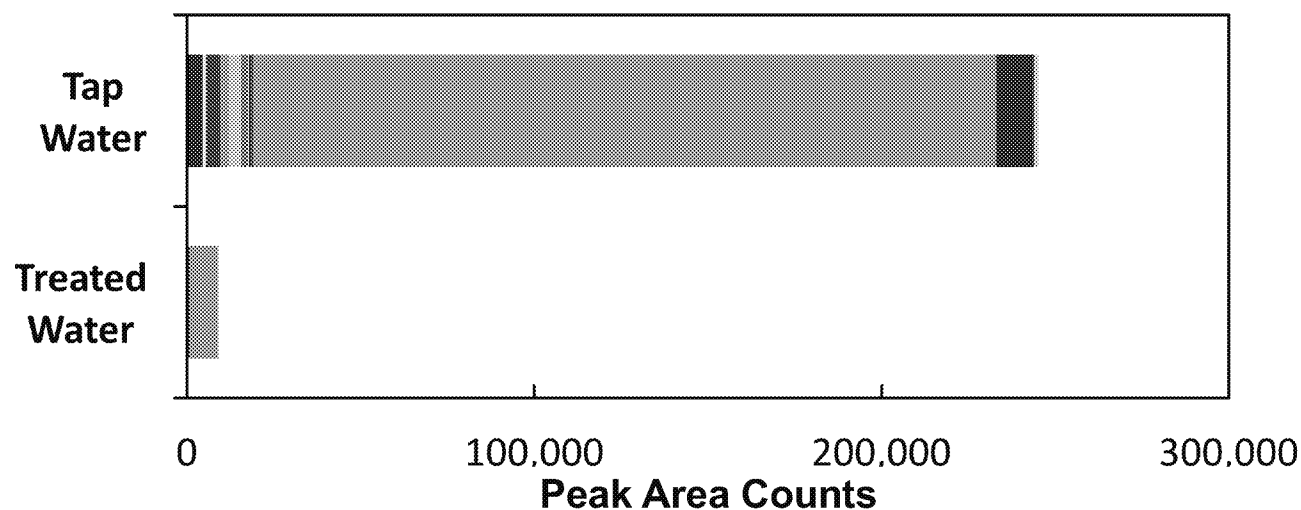
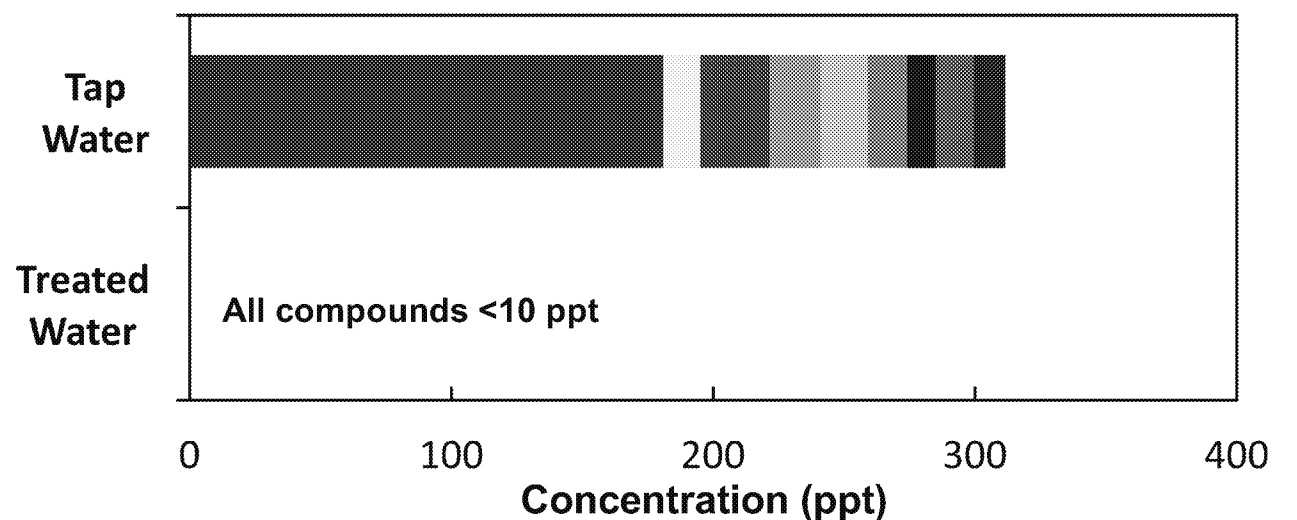
Date: June 30

Device:

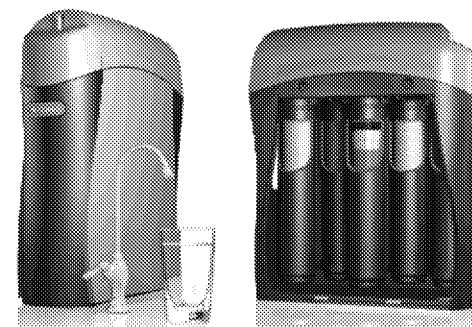
APEC RO-45

Water:

Cape Fear Public
Utility Authority
(Sweeney WTP)



Reverse Osmosis



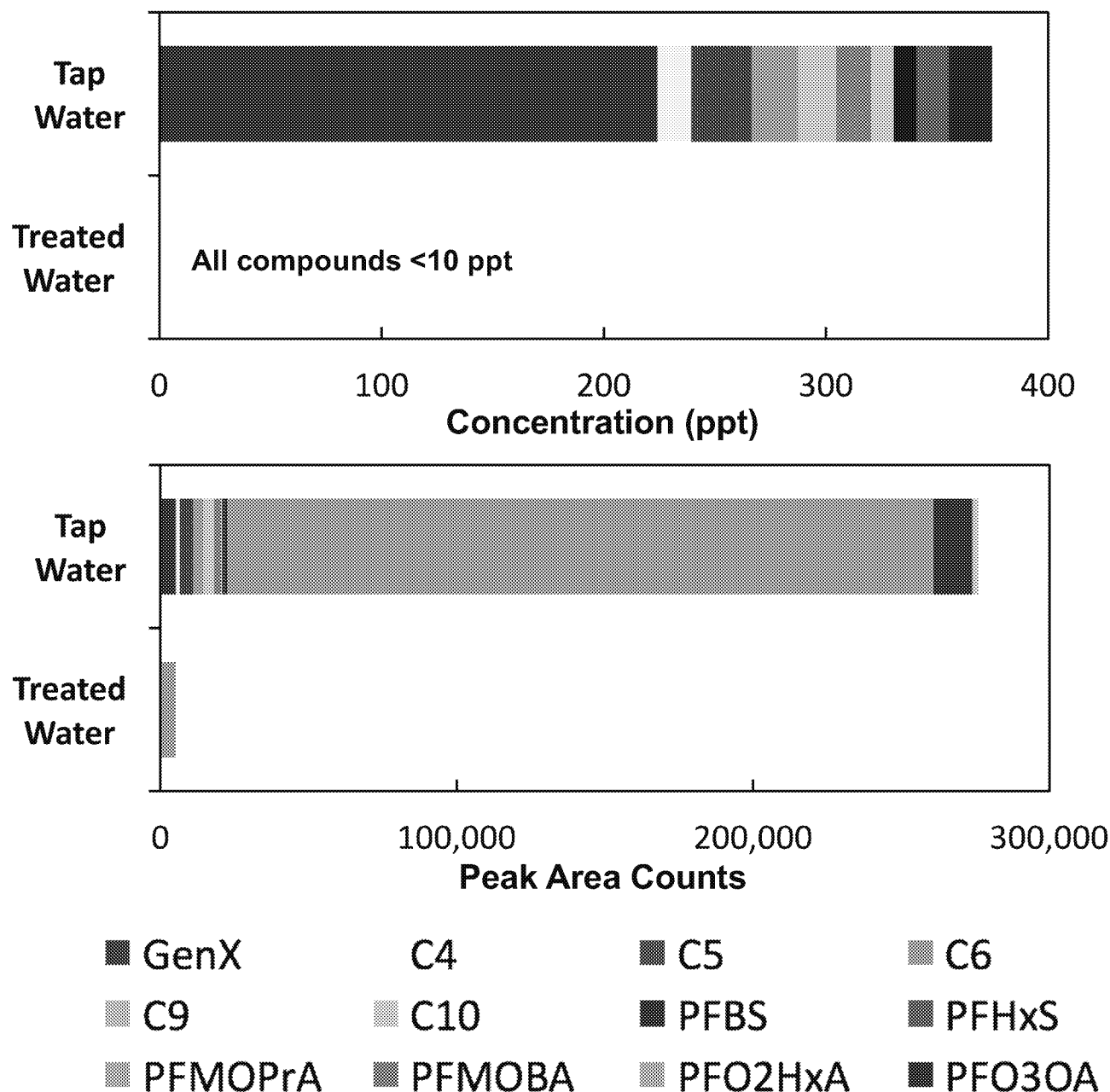
Date: June 30

Device:

Kinetico K-5

Water:

Cape Fear Public
Utility Authority
(Sweeney WTP)



Reverse Osmosis



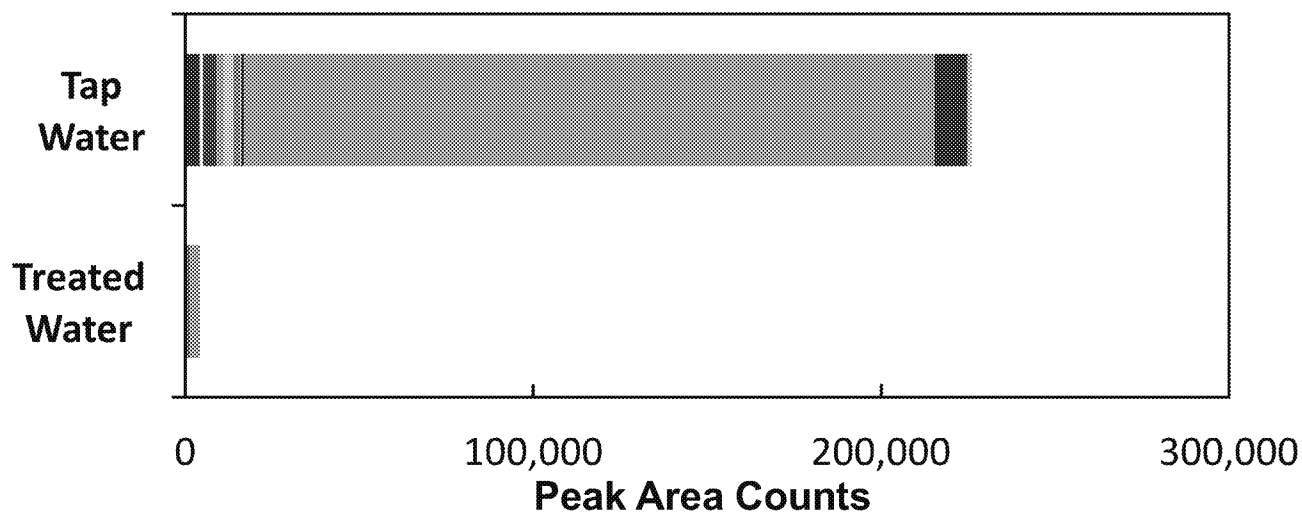
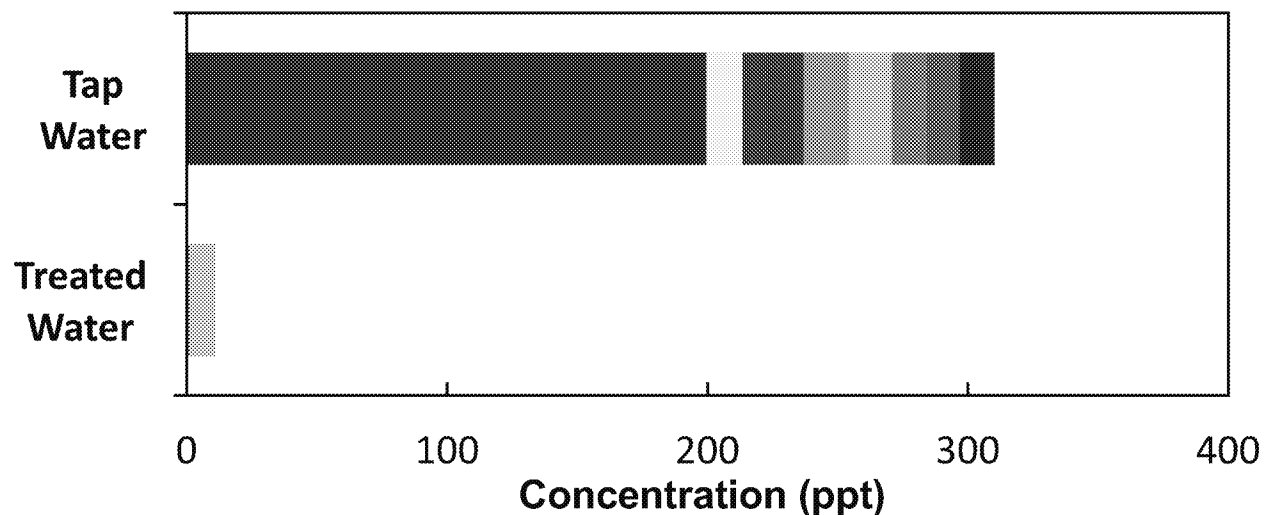
Date: June 30

Device:

Culligan Aqua-Clear

Water:

Cape Fear Public
Utility Authority
(Sweeney WTP)



■ GenX	■ C4	■ C5	■ C6	■ C7	■ C8
■ C9	■ C10	■ PFBS	■ PFHxS	■ PFOS	■ PFMOAA
■ PFMOPrA	■ PFMOBA	■ PFO2HxA	■ PFO3OA	■ PFO4DA	

GAC/IX/RO



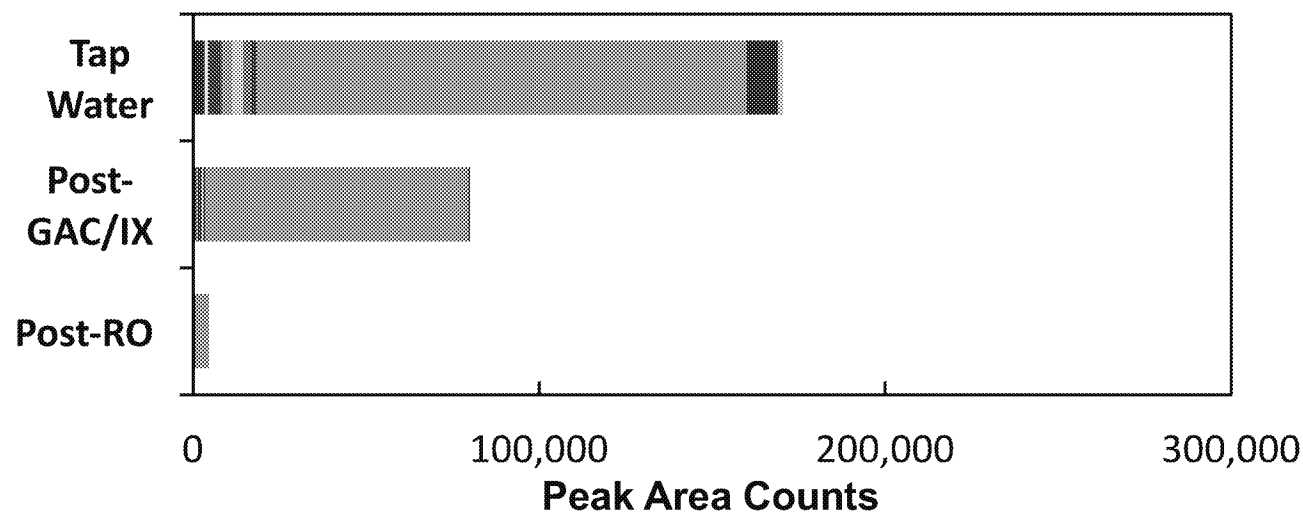
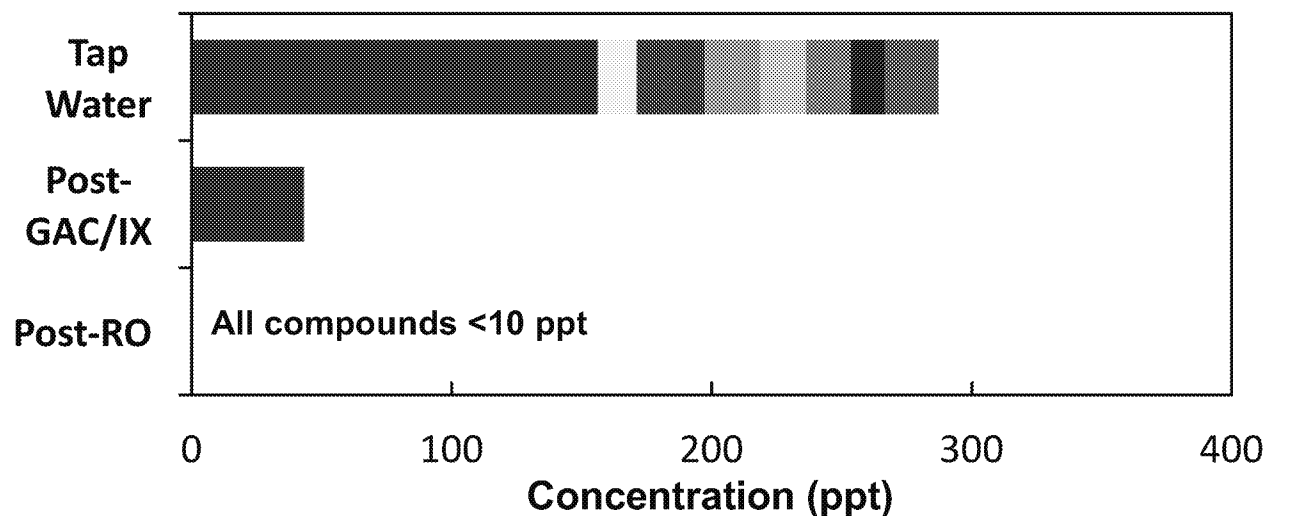
Date: June 30

Device:

Purionics Clarius IGEN (GAC)
Purionics Defender IGEN (IX)
Purionics Micromax 7000 (RO)

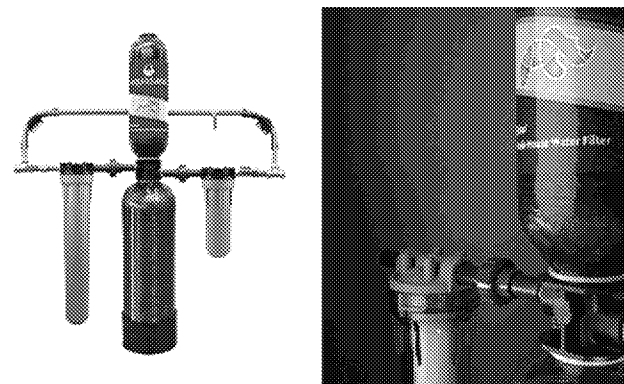
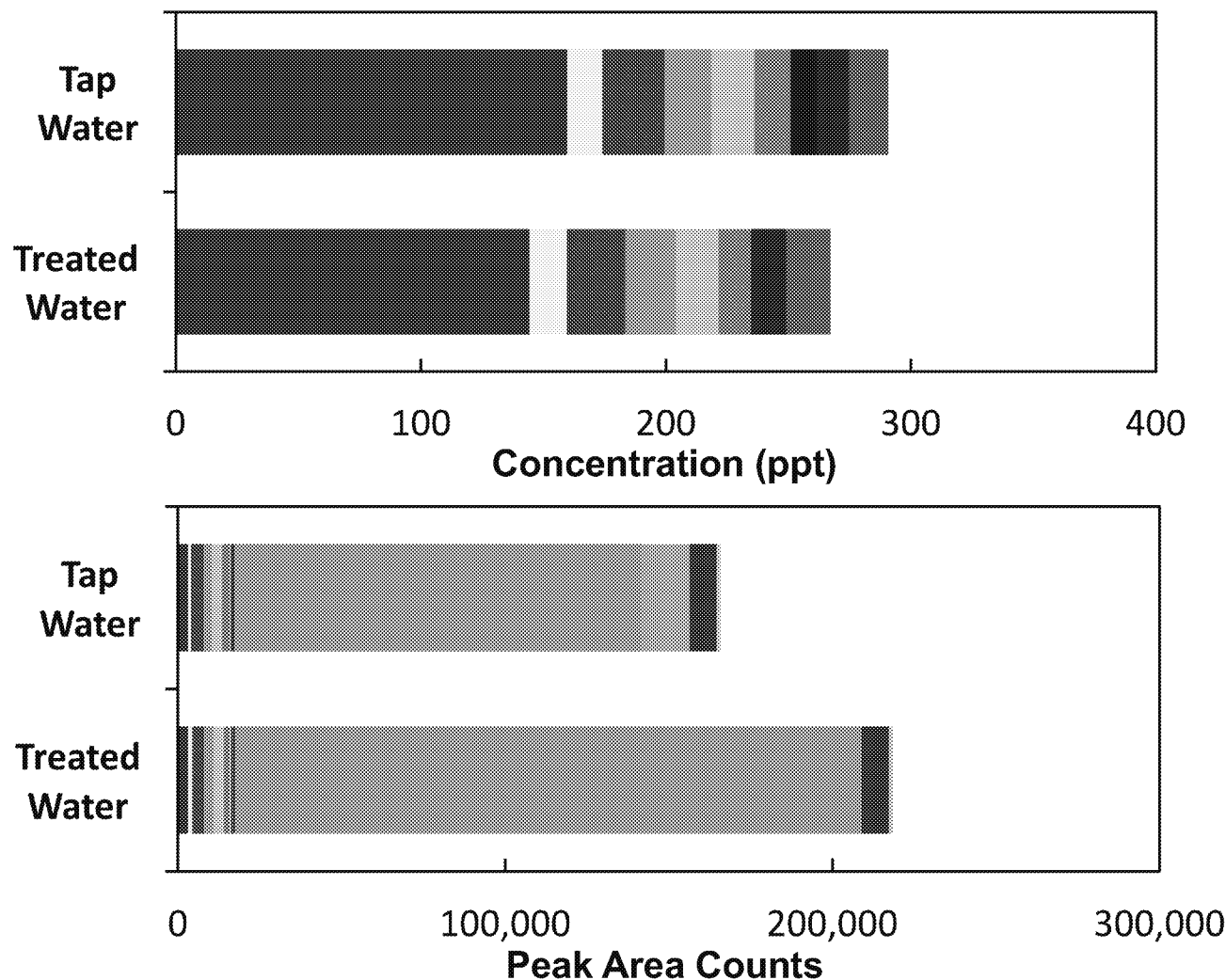
Water:

Cape Fear Public
Utility Authority
(Sweeney WTP)



■ GenX	■ C4	■ C5	■ C6	■ C7	■ C8
■ C9	■ C10	■ PFBS	■ PFHxS	■ PFOS	■ PFMOAA
■ PFMOPrA	■ PFMOBA	■ PFO2HxA	■ PFO3OA	■ PFO4DA	

Granular Activated Carbon



Date: June 30

Device:

Aquasana EQ-1000

Water:

Cape Fear Public
Utility Authority
(Sweeney WTP)

■ GenX	■ C4	■ C5	■ C6	■ C7	■ C8
■ C9	■ C10	■ PFBS	■ PFHxS	■ PFOS	■ PFMOAA
■ PFMOPrA	■ PFMOBA	■ PFO2HxA	■ PFO3OA	■ PFO4DA	